BAE SYSTEMS

Maturing Diode Pumped Laser Fire Control

Mission Electronics

Laser Products Group

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Brief to NDIA Conference

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Agenda:

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- **Laser Fire Control Overview**
  - Market needs
  - BAE Product Thrust
- **Military laser description**
- **Why laser designation**
- **Laser technology description**
- **Maturing the technology**
- **What the war-fighter gets**
- **Summary and Conclusions**

Market / Customer Needs

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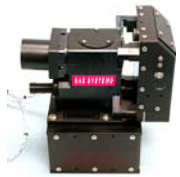
- **Laser Functions: Designation, Range Finding, Illumination (Imaging) and Combat Identification**
- **Diode Pumped Solid State Laser (DPSSL) Technology**
  - Extended Range
  - Higher Reliability
- **Best Value - NRE and Recurring**
  - Economies of Scale
  - Commonality
- **Low Power and Thermal**
- **Compact, Low Weight Packaging**
- **Complete EO/IR Solutions**
  - Fire Control Source w/ All EO/IR Included

BAE SYSTEMS Provides

- **Diode pumped LDRFs**
  - State of The Art DPSSL Laser Technology
  - FW Product Offering, Compact RW Concepts
  - Smaller systems…developing
- **LADAR Technology**
  - Complete LADAR System
  - LOCAAS & NLOS LADAR Transmitter
- **Mid-Wave IRCM Lasers**
- **EO/IR solutions**
  - Small fire control systems…developing
- **Other Developing Products & Technologies**
  - Laser Comms, High Energy Laser Systems



Military Laser Technology

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- **What is a laser…**(Laser stands for light amplification by stimulated emission of radiation.)
- **Laser Use on the Battlefield.** The use of laser technology on the battlefield has developed in three primary areas: laser target ranging and designation systems, laser acquisition systems, and laser-guided munitions (LGMs).
- (1) Laser target ranging and designation systems provide accurate directional distance and vertical angle information for use in locating enemy targets. These systems may vary from hand-held to aircraft-mounted devices, but they all perform the same basic function. Once a target has been selected and accurately located, the laser designation capability is used to identify the specific target for laser-guided munitions.
- (2) Laser acquisition devices are used to acquire reflected laser energy. These devices are used in conjunction with laser designation systems to pinpoint targets or other specific items. Normally, laser acquisition devices are mounted on fixed-wing aircraft or helicopters.
- (3) Laser-guided munitions home in on reflected laser energy during the terminal portion of the attack to accurately hit the specific target. Such munitions are part of the precision guided munitions (PGM) family.

Why Laser Designation?

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- **Precision targeting**
  - Reduce casualties
  - Fratricide
  - Precision strike options
- **Precision munitions**
- **Our doctrine**
- **Bringing steel on target effectively and efficiently**

Diode Pumped Laser Technology

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- **Solid State**
- **Diode pumped vs. Flash lamp LDRF**
  - Flash lamp…more power required
  - Greater thermal issues
  - Not eye-safe
  - SWAP
- **Two color (tactical & eye-safe) requirement**
- **New specifications require diode pumped lasers**
- **Emerging technology for other applications**
- **Diode pumped lasers provide:**
  - Reduced size & weight
  - Reduced power requirements
  - Reduced thermal management issues
  - Extended ranges and high brightness

Maturing Diode Pumped Laser Technology

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- **Issues:**
  - Cost
    - Diodes
    - Design
    - NRE
  - HTI (Horizontal Technology Insertion)
  - Product maturity
  - Limited production houses
  - Requirements (Smaller, lighter, performance)
  - Operation over temperature
- **Potential solutions:**
  - MANTEC options
  - Partnerships with industry, war-fighter and DOD labs
  - Continued investment
  - Expand the manufacturing base

What does the war-fighter get:

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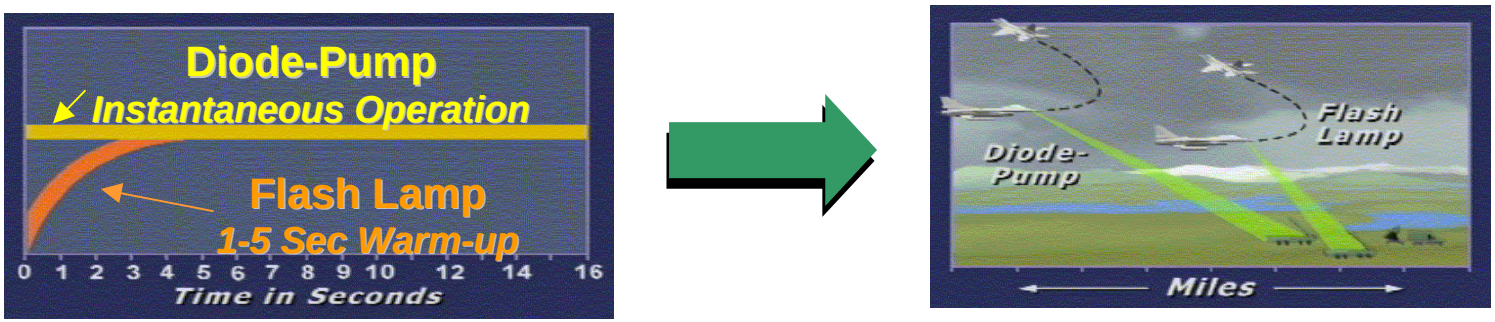
- Instantaneous operation … increases survivability by increasing standoff range



- High brightness improves targeting effectiveness under adverse battlefield conditions
- Size, weight and better performance
- Electronic battlefield ready…hit the enemy at extreme range before they can react…exceedingly difficult to defend against
- BAE SYSTEMS intent is to provide “state of the art” laser technology for fire control systems for the DOD FW, RW and ground applications

Summary

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- **Customer needs**
  - Performance & SWAP
  - Technology transition
  - DOD Requirements
- **Issues**
  - Product maturity
  - Funding
  - Operational Requirements
- **Solutions**
- **What the war-fighter gets**